WPS4650

POLICY RESEARCH WORKING PAPER 4650

Do the Biggest Aisles Serve a Brighter Future?

Global Retail Chains and Their Implications for Romania

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The World Bank
Development Research Group
Trade Team
June 2008

Policy Research Working Paper 4650

Abstract

During the past two decades many economies have opened their retail sector to foreign direct investment, yet little is known about possible implications of such liberalization on the economies of developing host countries. Using firm-level data from Romania, this study examines how the presence of global retail chains affects firms in the supplying industries. Applying a difference-in-differences method, the econometric analyses yield the following conclusions. The expansion of global retail chains leads to a significant increase in the total factor productivity in the supplying industries. Their presence in a region increases the total factor productivity of firms in the supplying industries by 15.2 percent and doubling the number of chains leads to a 10.8 percent increase in total factor productivity. However, the expansion benefits larger firms the most and has a much smaller impact on small enterprises. This conclusion is robust to several extensions and specifications, including the instrumental variable approach. These results suggest that the opening of the retail sector to foreign direct investment may stimulate productivity growth in upstream manufacturing and extend our understanding of foreign direct investment in service sectors.

This paper—a product of the Trade Team, Development Research Group—is part of a larger effort in the department to investigate the implications of inflows of foreign direct investment for developing countries. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at beata.javorcik@economics.ox.ac.uk or yli7@worldbank.org.

Do the Biggest Aisles Serve a Brighter Future? Global Retail Chains and Their Implications for Romania

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The authors would like to thank Davin Chor, Ana Fernandes, Caroline Freund, Bernard Hoekman, Leonardo Iacovone, Hiau Looi Kee, Aaditya Mattoo, Alessandro Nicita, Thomas J. Prusa and seminar participants at Rutgers University, the World Bank international trade seminar and Empirical Investigations in Trade and Investment conference in Tokyo for useful comments, and Bruno Bonansea for help with the regional distribution figures. The views expressed in the paper are those of the authors and should not be attributed to the World Bank, its Executive Directors or the countries they represent.

1. Introduction

During the past two decades many countries, including some developing economies, have opened their retail sector to foreign direct investment (FDI). This liberalization has resulted in the emergence and rapid expansion of global retail chains. For instance, Wal-Mart, the world's largest retail chain and the largest company, has 2,913 outlets in 13 countries outside the United States, ten of which are in the developing world. French retailer Carrefour, the second largest retailer in the world and the largest in Europe, currently operates 8,688 outlets in 28 foreign countries, including 20 developing countries, while in 1990 it was present in only countries outside France. Despite the phenomenal growth of global retail chains, little is known about their potentially profound impact on the economies of developing host countries.

The entry of global retail chains may transform the retail sector and, more importantly, may affect the supplying industries in the host economy. Global retail chains differ from indigenous retailers not only in terms of scale but also because of their access to advanced technologies, modern management strategies and global sourcing networks. Their entry may change the landscape of the retail sector in the host country through increased concentration and modernization. More importantly, their expansion may have implications for supplying industries in terms of lowering distribution costs, stimulating economies of scale, and increasing competition due to greater ability of foreign retailers to source products from abroad. The competition effect may in turn encourage productivity improvements and innovation among suppliers. Some of these effects have been documented in a recent case study describing the effects of Wal-Mart's entry on detergent producers in Mexico (Javorcik, Keller and Tybout 2006).

Despite the growing importance of global retail chains and the potentially large implications of FDI inflows into the retail sector, little effort has been devoted to understanding the channels through which the entry of global retailers may affect the economy of a host country.[1] This study is a step towards filling this gap in the literature.

To shed light on the implications of opening the retail sector to foreign direct investment,

[1] Most recent work on the impact of foreign direct investment on indigenous firms has analyzed inter-industry effects of foreign entry and some has extended to FDI in service sectors. However, inter-industry impact associated with FDI in retail sector taking place through backward linkages has not been systematically examined in the literature. The existing work on retail sector and supermarket chains in the context of developing countries provides us with broader insight of the development in modern retailing. The existing studies, however, do not distinguish between foreign chains and domestic retailers and hence, do not clarify the potential impact of FDI inflows in the sector. Moreover, they focus only on the implications for agricultural producers. See the next section for more details.

this study uses panel data on retailers and manufacturing firms operating in Romania during the period 1997-2005. The analysis proceeds in two steps. First, we document differences between characteristics of global retail chains and other retailers. We show that Romanian subsidiaries of global retailers are indeed larger in size, more capital intensive and exhibit higher labor productivity than other retailers operating in the country. Second, we use a difference-in-differences method to examine the effects of the entry of global retail chains on the performance of the supplying industries. Our identification strategy relies on the differences in the timing of the entry of global retail chains into Romanian regions and the fact than only some industries within each region should be affected. We use both OLS and instrumental variable approaches. We find that an expansion of global retail chains leads to a significant increase in the total factor productivity in the supplying industries in the region where the expansion took place. Their presence in a region increases TFP of firms in the supplying industries by 15.2 percent and doubling the number of chains leads to a 10.8 percent increase in TFP. Larger manufacturers seem to be affected more than small enterprises.

Our results suggest that opening of the retail sector to FDI may stimulate productivity growth in upstream manufacturing and provide another piece of evidence in favor of services liberalization.

This study is structured as follows. Section 2 reviews the related literature. Section 3 discusses the channels through which presence of global chains may affect supplying industries. Section 4 describes the data. In section 5, we compare the performance of global retail chains to that of other retailers operating in Romania. In section 6, we examine the link between the expansion of global retail chains and the performance of the supplying sectors in Romania. Section 7 concludes the paper.

2. Related Literature

Two strands of the literature are relevant to this study. The first one is research on how inflows of foreign direct investment affect manufacturing industries in a host economy. A large number of studies search for intra-industry effects, postulating that foreign entry may result in knowledge spillovers to local firms as well as in local producers losing part of their market share to foreign entrants. Empirical analyses based on firm-level panel data produce mixed results. While Aitken and Harrison (1999) find that an increase in FDI presence negatively affects the total factor

productivity of indigenous firms operating in the same industries in Venezuela, Djankov and Hoekman (2000), Aghion et al. (2004) and Haskel et al. (2007) reach the opposite conclusion.[2] More recent studies have argued that while foreign investors have an incentive to prevent knowledge leakage to their competitors, they may encourage transfer of information to their local suppliers. And indeed work by Javorcik (2004) and Blalock and Gertler (2007) shows a positive association between FDI and productivity in upstream industries (for a literature review see Görg and Greenaway 2004).

Compared with work on manufacturing industries, studies on the implications of FDI inflows in service sectors are relatively scarce. Eschenbach and Hoekman (2006) document a positive relationship between progress in services liberalization, including openness to FDI, and economic growth in transition countries for the period of 1990-2004. Mattoo et al. (2006) present econometric evidence from a sample of 60 countries over 1990-1999 indicating that openness in the financial and telecommunications sectors influences long-run growth performance. Arnold et al. (2006) analyze firm-level panel data from the Czech Republic and find a significant positive effect of FDI in the services sectors on downstream manufacturing firms' total factor productivity (TFP). Using industry-level panel data, Fernandes (2007) shows progress in service sector liberalization leads to an increase in labor productivity of downstream manufacturing in transition countries. The results of these studies suggest that the quality and availability of services inputs used by manufacturing industries may be positively affected by entry of foreign services providers. There is, however, no work documenting the possible implications of foreign entry into services in general (and retail sector in particular) for the performance of manufacturing firms in the supplying industries.

The second literature relevant to this study consists of case studies on the evolution of the retail sector in developing and transition countries. A series of studies describe the rise of modern retail formats, contrast them with traditional retailers and examine the implications of this phenomenon for agricultural producers. Dries, Reardon and Swinnen (2004) draw a detailed picture of the evolution of supermarkets in Central and Eastern European (CEE) countries and discuss their implications for the agricultural sector. Swinnen et al. (2006) document how FDI in the retail sector in some CEE countries facilitates productivity growth of local dairy farmers. Reardon and Berdegue (2002) and Reardon, Timmer, and Berdegue (2003), Minten,

[2] For a review of the literature, see Görg and Strobl (2001).

Randrianarison and Swinnen (2006), Mattoo and Payton (2007) provide similar analysis on the rise of supermarket in Latin America, Asia and Africa and their effects on the agricultural sector. The majority of these case studies, however, do not distinguish between foreign supermarket chains and domestic ones and thus do not advance our understanding of the effects of FDI. Secondly, their focus is limited to suppliers of agricultural products.[3]

Several recent case studies are devoted to the implications of FDI inflows. Chavez (2002) describes the evolution of foreign retail chains and Mexican domestic retailers around the formation of NAFTA and the increasing competitive pressure caused by the entry of foreign retailers. Javorcik, Keller, and Tybout (2006) document how the entry of Wal-Mart into Mexico has facilitated the modernization of the retail sector and has stimulated fundamental changes in the relationship between retailers and suppliers of soaps, detergents, and surfactants in Mexico. They find that Wal-Mart's entry has driven high-cost suppliers out of business, benefited surviving producers by providing access to a larger market and prompted suppliers to introduce more innovations. In contrast, a case study by Durand (2007) concludes that FDI has played an important role in modernizing the retail sector in Mexico, but has dampened the performance of local retailers and retail wages by introducing higher competitive pressures. These case studies suggest that there may be a strong relationship between the presence of global retail chains and the performance of supplying firms but the direction of such a relationship is still an open question.[4]

3. Expansion of Global Retail Chains and Supplying Industries in the Host Country

The entry of global retail chains may affect the performance of firms in the supplying industries of the host economy through several channels. First, it may increase competitive pressures on suppliers. As retail chains become more important, their bargaining power vis a vis suppliers strengthens. Moreover, thanks to their extensive international sourcing networks global retail chains often have the option of importing products rather than purchasing them locally. This stronger position (relative to other retailers operating in the host country) allows global retail chains to require suppliers to lower prices and/or improve products. This in turn forces

[3] Igan and Suzuki (2007) examine the price impact of modern retailers in Central and Eastern European countries by employing a cross-country regression and find that increases in modern retail stores significantly reduce food inflation.

[4] A related literature reviewed by Basker (2007) examines the effects of Wal-Mart's expansion in the U.S. on various aspects of economic activity.

suppliers to become more efficient. For instance, Mexican-owned detergent producers have reported introducing incremental improvements to their products in order to avoid drastic price cuts demanded by Wal-Mart (Javorcik et al. 2006).

Second, entry of global chains possessing cutting-edge retail technologies and familiar with best international practices may help lower costs faced by suppliers. Rather than sending their products to a large number of small retailers, suppliers may deliver larger shipments to several retail outlets. Thanks to computerized inventory systems used by global retail chains, suppliers may be better informed about changes in demand and may be better able to tailor products to the expectations of consumers. For instance, Wal-Mart provides its suppliers with full and free access to real-time data on how their products are selling. Suppliers can plan production runs earlier and offer better prices (Economist 2001). Tesco tracks every purchase through its Club card and can use this information to help its private-label suppliers to test and adapt innovations (The Boston Consulting Group 2007). Saving on employee time and usage of capital (e.g. truck fleet) when arranging distribution and planning production, suppliers may produce more output with the same amount of labor and achieve higher total factor productivity. Finally, global retail chains could stimulate economies of scale among suppliers by offering producers a larger market (both in the host country as well as abroad).

In sum, by increasing competitive pressures on suppliers, cutting distribution costs and offering easier access to information and a larger market global retail chains may stimulate productivity growth in the supplying industries.

4. Data

This study examines the link between the expansion of global retail chains and developments in the supplying industries in the context of Romania. Focusing on Romania has three advantages. The first advantage is the availability of high quality and comprehensive firm-level data. We have time-varying information on 513,554 companies operating in Romania during the period 1996-2005. The data set contains information on firms of all sizes, including those with one employee. As small or medium-sized enterprises (SMEs) in the supplying industries may be affected to a different degree than large companies, being able to include them in the analysis is an advantage. The second advantage of using Romanian data is the timing of the entry of global retailer chains. They started entering Romania only in the mid-1990s which

means that our data cover both the pre- and the post-entry period. The third advantage is that Romania is a large country. With a population of 22 million and an area about 238,000 km^2, it encompasses 42 county-level administrative units and eight broader NUTS regions.[5] Thus, in our econometric analysis, we are able to rely not only on inter-temporal but also on cross-regional variation in the presence of foreign chains.

The main data source for this study is the commercial data base Amadeus published by Bureau van Dijk. It contains information on about 9 million public and private companies in 38 European countries over the 1996-2005 period. Amadeus includes data on location, contact information, industry classification, standard financial statements and detailed shareholder information including the country of origin.

To identify global retail chains, we use information on company name, industry classification and ownership from Amadeus which we cross check against the information on major international retail chains in "World Retail Data and Statistics 2006/2007" and "European Marketing Data and Statistics" published by Euromonitor International, "Economist Intelligence Unit (EIU) Industry Briefing, Romania: Consumer goods and retail background", GAIN report by USDA Foreign Agriculture Service and Dun & Bradstreet Business Report. We identify 9 global retail chains operating in Romania. Their names and characteristics are listed in Table 1.

Amadeus data base provides aggregate figures on company operations in Romania. More detailed data on the presence of global retail chains in different Romanian regions were obtained by contacting each retail chain directly. We were successful at collecting information on the opening date of all stores, their location and selling space for 7 of the 9 chains operating in Romania. We did not manage to obtain the data for Kaufland which entered Romania during the last year of the sample and Mega Image which is one of the smaller entrants. For more details, see Table 1.

In addition to ownership information, we use information on output, production inputs and profit from balance sheets and income statements. We drop observations with negative values of turnover, materials and tangible fixed assets and unusually large fluctuations in values of variables. In manufacturing industries, we end up with 49,552 companies in the sample. When we incorporate industry-level import and export figures in the analysis we further restrict the sample to 49,390 manufacturing companies. In the retail sector, we restrict our attention to firms

[5] NUTS stands for the EU nomenclature of territorial units for statistics defined by Eurostat.

with an average employment over 50, which leaves us with roughly the top 1% of all observations for that sector or 932 firms.

We deflate output by the producer price index (PPI) for the three-digit NACE sector, obtained from the *Statistics Year Book of Romania*. We measure labor input as the number of employees, and capital as deflated tangible fixed assets. The capital deflator is a simple average of PPI from five NACE sectors.[6] We define material inputs as material costs deflated by the weighted average of PPI of the supplying sectors with the weights given by 2000 input-output matrix provided by the Statistical Institute of Romania. Real wage is deflated by the consumer price index from the IMF's *International Financial Statistics* (IFS).

To control for region-specific demand, we calculate the average real wage per worker at the regional level. We use data on wages and employment of all companies operating in Romania during the period of 1997- 2005 listed in Amadeus data base, including all firms active in agriculture, industry, and services sectors. The data are deflated by the same consumer price index. Finally, we also use information on imports and exports obtained from the UN's COMTRADE database and deflate it by the GDP deflator from IFS.

5. Global Retail Chains in Romania

5.1 Expansion of Global Retail Chains

While the focus of this study is the relationship between the presence of global retail chains and the performance of the supplying industries, we first turn to developments in the Romanian retail sector. Relative to other services, retail and wholesale sector accounts for a large portion of Romania's economic activity. In both 1997-2000 and 2001-2004 periods, it contributed about 10% to total employment and value added of the economy (Fernandes 2007). It was the largest service sector in terms of employment.

Compared to other Central and Eastern European countries, the retail sector in Romania is a late boomer in terms of FDI inflows. The first entry of foreign retail chains into the Czech Republic, Hungary, and Poland took place in the early 1990s and a broader expansion of these chains occurred around the mid-1990s. The first entry of global retail chains into Romania, however, did not take place until 1997 when the German chain Metro opened its first Metro Cash

[6] These are: machinery and equipment; office, accounting, and computing machinery; electrical machinery and apparatus; motor vehicles, trailers, and semi-trailers; and other transport equipment.

& Carry outlet in Bucharest. It took another two years before other large European retailers entered Romania. Only since year 2000, Romania has seen rapid expansion of foreign retailers, including Carrefour from France, REWE from Germany, and Cora from Belgium (see Table 2). In 1999, there were only 5 outlets of 3 global retail chains operating in Romania. From 1999 to 2001, the number of outlets increased fivefold. From 2001 to 2005, the number again tripled and reached a total of 86 outlets. The total selling space of global retail chains increased 10 times from 43,000 square meters in 1999 to 463,000 square meters in 2005 (see Table 3).

Following the trend observed in other transition economies, foreign chains have become dominant players in the Romanian retail sector in which there are few significant domestic players. In 1999, they employed around 1,400 workers, invested 44 million dollars in capital stock and generated 3.2% of total retail sales. In 2005, they had a total workforce of more than 18,900, a total capital stock of 844 million dollars and generated 3.27 billion dollars in sales, accounting for about 22.2% in total retail sales. (See Table 2)

The expansion of global retail chains in Romania was not uniform across regions. The area around the capital city Bucharest, especially its outskirts, was the initial focus of their entry. The Western region, close to Hungary, also attracted a lot of entry in the initial period (see Table 4).[7] In 2005, the regional distribution of outlets was still uneven. There were 16 and 19 outlets in Bucharest and West, respectively, but only 4 outlets in Northeast and 3 in Southwest (see Figure 1).

The expansion strategy depended on the history and the nature of each chain's activities. Cash & carry market has a longer history in Romania, starting with Metro's entry in 1997, and it sells to private traders/stores as well as households. Such chains have expanded into large and medium-sized cities. The hypermarket format was first introduced into Romania in 2001 by Carrefour and is the largest of all formats targeting households. Hypermarkets, therefore, concentrate in cities with population more than 300,000.[8]

[7] The regional classification is based on the community nomenclature of territorial units for statistics (NUTS) defined by Eurostat.

[8] Hypermarkets are defined as retail outlets selling groceries and non-food merchandise with a retail sales area of over 2,500 square meters. They are frequently located in out-of-town sites or as the anchor store in a shopping center.

5.2 Performance Premium of Global Retail Chains

To shed more light on the importance of global retail chains in the Romanian retail sector, we explore the extent to which they differ from other retailers with respect to a number of performance indicators. We do so by estimating a simple model on the data for the 1997-2005 period:

$$y_{it} = \alpha_0 + \alpha_1 \cdot global\_chain_{it} + \alpha_2 \cdot \ln age_{it} + \alpha_3 \cdot \ln L_{it-1} + \alpha_r + \alpha_t + \varepsilon_{it} \qquad \textbf{(1)}$$

where y_{it} is the outcome variable for retailer i operating at time t capturing the retailer's performance. The performance indicators include employment, capital stock, capital-labor ratio, total sales, market share, sales per worker, real wage per worker, value added per worker (value added is defined as the difference between sales and material costs), return to assets (computed as the ratio of profits to total assets), and return to sales (calculated as the ratio between profits and total sales).[9] Except for market share, return to assets and return to sales, all variables enter in a logarithmic form. We define $global\_chain_{it}$ as a dummy taking on the value of one if the retailer i is one of the 9 identified global retail chains and zero otherwise. The estimate of α_1 is, therefore, the premium associated with global retail chains. We control for the logarithm of age_{it}, defined as the number of years since establishment to capture the learning-by-doing effects. To control for size differences between different retailers we include one period lag of employment (also in logarithmic form). To control for regional differences in economic conditions, we include region fixed effects α_r. We also include year fixed effects, α_t, to take into account macroeconomic shocks, such as for instance, the 1998-1999 Russian financial crisis. As it does not seem meaningful to compare global retail chains to one-person kiosks or family-run street vendors, we limit the sample to retailers and wholesale traders with an average employment over 50, which leaves us with the top 1 percent of all the observation or 932 firms (see Table 5 for summary statistics).

We present the estimated premium associated with being a global retail chain for ten performance indicators in Table 6. We find that global retail chains differ significantly from other retailers in Romania. The estimated premium for the eight indicators is positive and statistically significant at the 5% level or better. As for the scale, foreign chains are much larger in terms of employment, capital stock and sales. They are more capital intensive (as measured by capital-

[9] Note that we use company-level data, as outlet-level information is not available for the variables of interest.

labor ratio). This is consistent with anecdotes that global retail chains tend to be leaders in adopting advanced retail technologies, from large sales rooms and warehouses to computerized inventory tracking systems. In terms of sales per worker, real wage per worker, and value added per worker, global retail chains exhibit a premium in terms of all three variables. They have higher sales per worker, higher labor productivity and tend to pay higher wages. Moreover, we find that global retail chains enjoy larger market shares. However, we do not find any differences in terms of profitability measured by return on assets and return on sales.

To summarize, although their entry into Romania lagged behind their expansion in other more advanced transition countries in CEE, global retail chains expanded rapidly in Romania since 2000. Their expansion was uneven across regions with Bucharest area receiving the first and the most entries. Overall, global retail chains have played an increasingly important role in the sector and accounted for over one fifth of the total retail sales in 2005. Our simple econometric analysis finds that global retail chains differ significantly from other retailers in the country. They are larger in scale and more capital intensive. They enjoy higher labor productivity and larger market share. Their rapid expansion and larger size suggest that they may have greater bargaining power vis a vis suppliers while at the same time offering them access to a larger market and lower costs. In short, the presence of global retail chains has brought significant changes to the landscape of the retail sector in Romania. In the next section, we explore the implications of their presence on the performance of the supplying industries, which is the main objective of this study.

6. Impact on the Total Factor Productivity in the Supplying Industries

6.1 Identifying Assumptions

In our analysis of the relationship between the presence of global retail chains and the performance of the supplying industries, we take advantage of regional variation in foreign chains' expansion. We rely on the Nomenclature of Territorial Units for Statistics (NUTS) and divide Romania into eight NUTS regions with an average territory of 29,800 square kilometers.[10] We focus on the changes in suppliers' performance following the entry of foreign chains into their region. Our presumption is that the impact of global chains' entry tends to be limited to the regional level.

[10] The 8 regions are Bucharest-Ilfov, North East, South East, North West, South West, South, West and Center.

We base our assumption on the following facts. First, while Romania is the third largest country in CEE with a territory of 238,000 km^2, its rail and road networks are among the least extensive in transition countries hindering development of national distribution systems. Romania's rail network, which is the main means of internal transport for passengers and freight, covers 14,217 km of which only 35% is electrified. Its rolling stock is in urgent need of replacement. According to information from the World Development Indicators, the railway density in Romania in 2004 is about 4.7 km per 100 km^2 of land area and falls behind that in Hungary (8.9 km per 100 km^2), Poland (6.4 km per 100 km^2) and Croatia (4.9 km per 100 km^2). The road infrastructure of Romania also lags behind that of western Balkan states such as Croatia, or Serbia and Montenegro. Up until 2002 Romania's public roads covered only 73,260 km, which amounted to about 30.7 km per 100 km^2 of land area. Less than one-quarter of roads were designated as modern and only 113 km were motorways. In the following years, the coverage of public road network increased to 78,000 km yet most of them still need almost constant repair (EIU country profile, 2003, 2006). In terms of total road density, there was about 86 km road per 100 km^2 land area in Romania, which was much less than 178 km per 100 km^2 in Hungary and 138 km per 100 km^2 in Poland (the World Development Indicators).

Second, the distribution system in Romania is underdeveloped as very few professional distributors are in operation. Foreign retails find it difficult to find distributors with the required skills and capital base (EIU 2004, 2006). Third, one of the global retailers confirmed that the company does not use a centralized procurement system in Romania and that each outlet independently sources goods for sale. This suggests that individual stores are more likely to source locally than nationally.

The underdevelopment of the transportation infrastructure and the distribution sector would limit retailers' ability to source products across regions. The potential spillover from global retail chains to the supplying sectors would, therefore, be constrained by regional boundaries. As we recognize that regional characteristics may affect the entry decision of global retail chains, we will also use instrumental variable approach in our analysis.

Our second identifying assumption is that entry of a global retail chain into the region should affect some manufacturing sectors but not others. More specifically, we believe that sectors supplying consumer products to supermarkets, as opposed to sectors supplying industrial inputs, should be affected. As food products are the most popular goods sold in all formats of

supermarkets, we narrowly define supplying sectors as food manufacturing industries and focus on the impact of global retail chains' expansion on these sectors. We identify food supplying sectors based on products listed on the web pages of retailers operating in Romania and match them with 3-digit industry codes in the NACE classification. For details on the food supplying industry classification see Table 7.

For the regional analysis to be meaningful, we would like to make sure that the affected sectors are represented in all regions of the country. This is indeed the case. All sectors are spread across all eight NUTS regions. In particular, manufacturing of fruit and vegetable products is represented in 37 counties in 1998 and 40 counties in 2004; manufacturing of diary products existed in 41 counties; and the remaining four sectors are spread across all 42 counties.

6.2 Descriptive Analysis

As the first step in our analysis, we consider some descriptive statistics. We estimate the distributions of the logarithm of total factor productivity for firms operating before and after the entry of global retail chains. We do so separately for food supplying sectors and for the remaining industries. These distributions are plotted in Figure 2. We note that the distribution of productivity shifts to the right in the post-entry period in the case of food supplying sectors. The pattern for non-food supplying sectors is less clear.

The difference becomes more significant at the regional level. We calculate the average level of the logarithm of total factor productivity for firms operating in a given region in a given time period. For both food supplying and non-food supplying sectors, we compare the distribution in the period before and after the entry of global retail chains. As shown in Figure 3, there is a clear shift of the distribution of productivity to the right in the post-entry period in the case of food supplying sectors. The pattern for non-food supplying sectors is not clear. While we cannot say anything about the direction of causality, these charts hint at a positive relationship between the productivity of the supplying industries and the presence of global retail chains.

As the pattern observed in Figure 2 and Figure 3 could be capturing effects of macroeconomic shocks or regional trends, we proceed to examine the relationship between the expansion of global retail chains and the total factor productivity in the food supplying industries using a regression analysis.

6.3 Empirical Strategy

In our empirical analysis, we use a difference-in-differences approach and compare the TFP in the supplying industries before and after the entry of foreign chains into their region with the TFP of non-supplying industries in the same region during the same period. As explained above, we narrowly define the supplying industries as sectors manufacturing food products.

To take advantage of regional variation in their entry, we use three ways to quantify the presence of global chains. Our first measure is a dummy taking on the value of 1 if at least one global retail chain is present in the region *r* at time *t*, and zero otherwise. As our second measure, we use the number of global retail chain outlets in the region *r* at time *t* in logarithmic form, adding one before taking a log. The third measure is the logarithm of the chains' total selling space in the region at time *t*.

We then conduct our analysis based on the following specification:

$$\ln TFP_{it} = \gamma_0 + \gamma_1 \cdot FOOD_s \times global\_chain_{r,t-1} + \gamma_2 \cdot \ln age_{it} + V_{s,t-1} \cdot \Gamma + \gamma_{rt} + v_i + \mu_{it} \quad \textbf{(2)}$$

where $\ln TFP_{it}$ denotes the logarithm of manufacturer *i*'s total factor productivity at time *t*. We calculate two sets of measures on TFP. The first one is a multilateral index measure following Aw, Chen and Roberts (2001). We first express individual firm's outputs and inputs (capital, labor and materials) as deviations from a hypothetical reference firm operating in the same sector at time *t* with average input costs shares, average logarithm of inputs and average logarithm of outputs and then chain-link all reference firms together over time within a sector. These productivity indexes are an extension to the multilateral TFP index derived by Caves et al. (1982) and they allow for consistent comparison of TFP of firm data with panel structure (see Appendix 1 for a detailed formula).

Our second method of obtaining TFP is the semi-parametric approach suggested by Levinsohn and Petrin (2003), which allows us to take into account the possibility that a firm's private knowledge of its productivity (unobserved by the econometrician) may affect the input decisions. This method allows for firm specific productivity differences that exhibit idiosyncratic changes over time and thus addresses the simultaneity bias between productivity shocks and input choices. Since our study relies on correctly measuring firm productivity, obtaining consistent estimates of the production function coefficients is crucial to our analysis. As suggested by Levinsohn and Petrin (2003), the estimation procedure relates value added to capital and labor inputs and employs the information on material usage to proxy for

unobservable productivity shocks. The estimated production function coefficients are reported in Appendix 2.

The explanatory variable of interest is the interactive term between the dummy for food supplying industries, denoted as $FOOD_s$, and a measure of regional presence of global retail chains, denoted as $global\_chain_{r,\,t-1}$. We lag the measures by one period to take into account the time lag needed for the effect to manifest itself and to attenuate potential endogeneity problems. We also control for other factors that may affect the performance of manufacturing firms. We use the number of years since establishment of a manufacturer to control for learning-by-doing effects. The variable is denoted as age_t and enters in a logarithmic form. We control for the effects of trade liberalization by including sector imports and exports. Both variables are lagged one period and take the logarithmic form. The level of competition in the industry is another potential factor influencing firm productivity and we use the Herfindahl index to take it into account. Summary statistics for all variables are listed in Table 8.

To take into account the uneven economic development across Romanian regions, we control for time-varying regional factors by including a set of region-year fixed effects. We also include firm fixed effects to take into account unobservable firm characteristics, such as managerial ability. These fixed effects will also allow us control for time-invariant sector characteristics, for instance, level of the sector development in the pre-transition period and extent of privatization during the early reform period.

Finally, we correct the standard errors to take into account the fact that the measures of global retail chains' presence are at the region-year level while the dependent variable is at the firm-year level. Failure to correct for such data structure may lead to a downward bias in the estimated errors. We perform the correction by clustering standard errors at the region-year level in all regressions.

6.4 Baseline Results

We report the baseline results in Table 9 and Table 10, with the multilateral TFP index and the TFP measure estimated following Levisohn and Petrin (20003) as the dependent variables, respectively. We present the estimates from the three measures on global chain presence separately, and report results from specifications without time-variant sector variables together with the full model. We find that the expansion of global retail chain leads to a

significant increase in the total factor productivity of the food supplying sectors. This effect is statistically significant at the 1 percent level across all specifications using different measures of foreign chain presence. Note that we do not need to include the variable $global\_chain_{r,\ t-1}$ by itself in the model as productivity changes coinciding with the chain's entry and affecting all manufacturing sectors equally will captured by region-year fixed effects.

In terms of multilateral TFP index, according to results from column 1 and 2 of Table 9, on average, the presence of foreign chains increases TFP of firms in food supplying sectors by 3.8-4.7 percent. Results from column 3 and 4 indicate that doubling the number of chains will lead to a 3.3-3.7 percent increase in firm productivity among food suppliers. The average regional growth rate of the number of foreign chains' outlets is 50%. If we take this as a benchmark, TFP of food suppliers increases by 1.6-1.8 percent per year for a region where foreign chains expand at the average speed. Finally, the results from column 5 and 6 suggest that doubling the selling space increases TFP of food supplying sectors by 0.4-0.5 percent.

In terms of the TFP calculated following Levisohn and Petrin (20003), the sign pattern of the results are similar to those using TFP index but the magnitudes of the coefficients are larger. In particular, the results imply that the presence of foreign chains leads to a 15.2-16.9 percent increase in the TFP of firms in food supplying sectors, that a doubling in the number of chains will increase productivity among food suppliers by 10.8-11.3 percent and a doubling in the selling space will increases their TFP by 1.7-1.8 percent. As the number of foreign chains' outlets rise by 50% on average in a region, TFP of food suppliers will increases by 5.4-5.7 percent per year for a typical region.

These productivity effects are comparable in magnitude to those found by studies examining spillover effects from FDI. For instance, in terms of intra-industry impact of FDI, Haskel et al. (2007) report that in the UK doubling the share of foreign employment in an industry increases firm TFP in the same industry by about 5 percent. As for inter-industry effects, Javorcik (2004) finds that in Lithuania doubling the foreign presence in downstream sectors is associated with a 3.8 percent rise in the TFP of domestic firms in the supplying industry.

As for the control variables, the coefficient on firm age is positive and significant across all specifications, which is consistent with learning-by-doing effects. The Herfindahl index is found to have a negative and significant coefficient. It suggests that higher concentration is correlated with lower productivity, which is in line with the belief that more competition

encourages better performance. Imports are negatively correlated with firm productivity and exports do not appear to matter at all. The results on imports differ from the conclusions of Pavcnik (2002) for Chile and Fernandes (2007) for Colombia, but are in line with the findings of Arnold et al. (2006) for the Czech Republic.

6.5 Robustness Checks

We subject our results to several robustness checks. Our analysis is conducted for both measures of TFP and yields conclusions highly consistent with each other. In what follows, to save space we only report the results from using TFP estimated following Levinsohn and Petrin (2003) as it captures technological changes and scale effects on TFP as well and is regarded a superior to the multilateral TFP index.

First, we consider possible outlier issues. Bucharest as the capital of Romania has disproportionate concentration of economic activity and wealth. It produces about 20% of the country's GDP while only accounting for 10% of total population.[11] To check whether our results are affected by the special case of Bucharest, we exclude observations from Bucharest and perform the benchmark analysis. As evident from Table 11, all coefficients on the presence of global chains remain positive and significant at the 1 percent level and have the same magnitudes. It indicates that our results are not driven by the observations from Bucharest.

Second, we estimate our model in first, second and long differences, instead of levels with firm fixed effects. As pointed out by Katayama, Lu, and Tybout (2006), there are several difficulties involved in using TFP to capture productivity improvements. Substitution of the data on sales revenues, depreciated capital spending and real input expenditure for information on the physical quantities of output, capital and intermediate inputs may lead to confounding higher productivity with higher markups. In our case, this is less of a concern as global retail chains are likely to press suppliers to lower their markups. Therefore, if our TFP measure is subject to the above problem, it will work against us finding a positive relationship between expansion of global chains and TFP of food supplying sectors. Nevertheless, as Katayama et al. (2006) argue that the problems with using TFP are reduced in difference specifications, we check whether our results are robust to doing so.

In the first and second difference specification, we drop firm age but we still include

[11] Calculated according to Eurostat REGIO database.

region-year fixed effects and cluster standard errors at the region-year level. We present the results in Table 12 and Table 13 respectively. The interactive term between *FOOD* and each of the three measures of the regional presence of global chains remains positive and statistically significant. The magnitude of the impact is smaller when using the dummy on presence of foreign chains. When using the number of outlets and selling space to proxy for foreign chains' regional presence the magnitudes are similar to the baseline results. As for other variables, the Herfindahl index still exhibits a negative correlation with TFP. Imports appear to have positive impact or no impact, which indicates the baseline results on imports are not robust. Exports, however, appear to be negatively correlated with TFP. In summary, our main conclusions remain robust.

We also conduct a simple cross-sectional regression on the overall changes in TFP during the period of 1997 to 2005. The measures on regional presence of supermarket and trade variables are lagged by one period covering 1996 to 2004. Correspondingly, we only include region fixed effects and cluster the standard errors at the regional level. The results are presented in Table 14. The overall changes in TFP of the food supplying sectors during the period are shown to be positively correlated with changes in the regional presence of global chains.

Furthermore, we want to examine whether our results are not subject to autocorrelation problem when using dummy on the presence of foreign chains. Bertrand et al. (2004) show that estimations with a difference-in-difference method using panel data are likely to be subject to serial correlation problems and the standard errors could be severely underestimated. To check for this potential estimation bias, we take their advice and ignore the time-series information when computing standard errors. We perform the test in three steps. First, we regress the logarithm of TFP on control variables (other than the variable of interest) and fixed effects and keep the residuals for food supplying sectors. Second, we divide the residuals into two groups: residuals from the years before foreign chains' entry and residuals from post-entry period and calculate a within firm average for each period. Finally, we regress the two-period panel of mean residuals on the dummy denoting the presence of global retail chains. In the second stage regression, we examine both contemporaneous value and one-period-lagged value of the dummy. As evident from Table 15, the dummy remains positive and significant at the 1 percent level though the magnitude becomes smaller. We, therefore, feel reasonably confident that our baseline results are not subject to the autocorrelation problem.

6.6 Potential Endogeneity Problem

To address potential endogeneity problem, we check whether there is evidence of an impact *before* the actual entry of global chains takes place in the region. As regional economic conditions vary across regions, global retail chains may choose to operate in regions where food supplying sectors are highly productive in the first place. If such reverse causality exists, food suppliers in regions that attract global chains should exhibit higher TFP before the entry of global chains. To capture firm performance in the pre-entry period, we define a new variable which takes the value of one in the year *prior* to the entry of global chains into the region, and zero otherwise. We include an interactive term between *FOOD* and this new dummy in our estimation. We report the results in Table 16. The new interactive term does not appear to matter while the interactive term between FOOD and global chain presence remains positive and statistically significant. We conduct t-tests and find that the coefficients on these two variables are significantly different from each other. These findings suggest that global retail chains are not attracted to regions with more productive food producers and thus give us confidence that reverse causality is unlikely to be a serious problem in our analysis.

We also employ an instrumental variable approach to take care of potential reverse causality and omitted variable bias. We instrument for the interaction between *FOOD* and global chain presence by taking into account the following factors. First, the expansion of global retail chains in Romania may be part of their business strategy for the whole Central and Eastern Europe (CEE). For instance, Dries et al. (2004) find that global retail chains tend to adopt "anchor" strategy in CEE by establishing their business first in relatively advanced countries, including the Czech Republic, Hungary and Poland, which they classified as "first wave countries", and then moving into nearby economies. Alternatively, these chains may face capacity limits when considering expanding into the CEE and thus may choose to enter only a subset of countries. Finally, the initial development in supplying industries may affect foreign retailers' entry decision into specific region. Based on all these factors, we use the following two instruments:

$$sale\_share_{sr} * \ln(global\_chain\_1stWave)_{t-1}$$
$$sale\_share_{sr} * \ln(global\_chain\_2ndWave)_{t-1}$$

The first part of each instrument, $sale\_share_{sr}$, denotes the sector share in the total regional

manufacturing sales in 1996, which is prior to the first year of our sample. It captures the initial condition (importance) of the sectors. The second part of each instrument captures annual sales by global retail chains which also operate in Romania in two groups of CEE countries (first wave countries as defined in Dries (2004) and the rest).[12] *global_chain_1stWave* represents total sales in first wave countries by chains having outlets in Romania and *global_chain_2ndWave* represents total sales in second wave countries by those chains. The figures enter in logarithmic form and are lagged by one period. The interaction of these two components creates sector-region-year specific instrumental variables which are consistent with the dimensions of our potentially endogenous variables.

The results from the instrumental variable approach, presented in Table 17, are consistent with our baseline results. They suggest that the regional expansion of global retail chains leads to a significant increase in the TFP of the supplying industries. The interactive term between *FOOD* and presence of global chains remains positive and statistically significant across all models. The magnitude is somewhat smaller relative to the baseline results. The Shea's partial R^2 reveals that our instruments are reasonable predictors of the potentially endogenous variable. Almost all instruments bear statistically significant coefficients. The Sargan test does not cast doubt on the validity of the instruments.

6.7 Regional Demand as an Alternative Explanation

The demand for consumer products in Romania is likely to increase following a rise in its income level. Being a transition economy, basic necessities, including food products, still dominate consumer consumption in the country. As reported in EIU (2002- 2006), Romania is still one of the poorest countries in Europe. GDP per head at purchasing power parity is estimated to be US$9610 in 2006, just over half of the level in Hungary. Consumption patterns typify those of a developing country of low to medium income. Most monthly earnings are consumed, and most of this spending goes to foodstuffs and housing maintenance. According to the data provided in the report, food retail sales accounted for over 58 percent and over 55 percent of total retail sales in 2001 and in 2005, respectively. Therefore, the demand for food products is likely to be more sensitive to income rise and increase faster than the demand for other manufacturing products. It could be the case that the increase in regional income stimulated

[12] Sales by retailers in Romania are excluded.

regional demand for food sectors more than that for other industries, and that higher demand encouraged food production and attracted global supermarket entering the region at the same time.

To examine our results against this alternative explanation, we compute the average real wage in the region as a measure of the regional income level. We add the interactive term between *FOOD* and logarithm of the average wage to our model and conduct our analysis with firm fixed effects, first differences and long differences. The results are reported in Table 18, Table 19 and Table 20[13], respectively. The interactive term between *FOOD* and wage rate is positively correlated with productivity in fixed-effect models but not in the first differenced model. This implies that the regional income level does affect firm productivity in food supplying sectors differently from non-food sectors. However, in terms of growth in firm productivity, the relationship between regional income level and productivity does not exhibit systematic differences across food and non-food sectors. Our variable of interest, the interactive term between *FOOD* and global chain presence, remains positive and statistically significant in all of the specifications. It implies that despite the impact of regional income changes, our main results still hold and suggest that the regional expansion of global retail chains facilitates productivity growth of food supplying sectors located in the same region.

We also repeat our instrumental variable estimates after including the control for the regional income level. We report the estimation results in Table 21. The F-tests and Shea's partial R2 show that the instruments are correlated with the potentially endogenous variable. However, the augmented models pass the Sargan test only in two of six specifications. In terms of estimates, the interactive term between FOOD and the measures of global chains' presence remains positive and significant at conventional levels. The coefficients on the interactive term between FOOD and regional average wage rate are similar to those produced by the fixed-effect estimation.

6.8 Extensions

As an extension we conduct the baseline analysis separately for manufacturing firms of different sizes. The results are reported in Table 22. We find that the positive correlation between

[13] As the wage data are only available only since 1997 and the explanatory variables are lagged by one period, these regressions are based on the period 1998 to 2005, which explains a smaller number of observations.

global chains' presence and the TFP of firms in the food supplying industries is verified across firm sizes, as the interactive term remains positive and significant at the 1 percent level. The estimated coefficient becomes smaller as the size of firms considered falls. This finding implies that the presence of global chains benefits large food suppliers the most and has a smaller impact on smaller firms. For suppliers with more than 25 employees, presence of foreign chains on average can lead to 19 percent increase in their TFP while for firms employing fewer than 5 people the chains' presence would only lead to 12 percent increase in their TFP. Similarly, a doubling in chain stores will lead to a 14.2 percent increase in TFP among suppliers with more than 25 employees but only an 8.5 percent increase among firms with fewer than 5 people. In our data, half of the firms are smaller than 5 employees and only less than a quarter of firms have more than 25 workers.

These results are intuitive in that as large retail chains tend to source large volumes they are more likely to work with larger suppliers. Thus it is not surprising that larger manufacturers are the major suppliers to global chains and hence, benefit most from their expansion. Small firms produce less for foreign chains, because they do not have the technology and financial support to meet the quality or quantity requirements set by the chains. Note, however, that it may be in the interest of retail chains to keep some small suppliers as a way of increasing price pressure on the larger producers (see the example of Wal-Mart in Mexico in Javorcik et al. 2006).

7. Conclusions

This study uses Romanian firm-level data to examine the link between the entry of global retail chains and developments in the supplying sectors. The econometric results lead us to the following conclusions. First, the expansion of global retail chains leads to a significant increase in the total factor productivity in the supplying industries. For instance, their presence in a region increases TFP of firms in the supplying industries by 15.2 percent and doubling the number of chains will lead to a 10.8 percent increase in TFP. However, their presence benefits larger firms the most and has a smaller impact on small enterprises. This conclusion is robust to several extensions and specifications, including the instrumental variable approach.

The results indicate that opening of the retail sector to FDI may stimulate faster productivity growth in upstream manufacturing in the context of transition and developing

economies. They also extend our understanding of FDI in service sectors and the implications of services liberalization.

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Appendix 1 Calculation of TFP index

We follow Aw, Chen and Roberts (2001) and calculate the index according to the following

$$\ln TFP_{it} = (\ln Y_{it} - \overline{\ln Y_t}) + \sum_{\tau=2}^{t} (\ln Y_\tau - \overline{\ln Y_{\tau-1}})$$

$$-[\sum_{\tau=2}^{t} \frac{1}{2}(S_{jit} + \overline{S}_{jt})(\ln X_{jit} - \overline{\ln X_{jt}}) + \sum_{\tau=2}^{t}\sum_{j=1}^{m} \frac{1}{2}(\overline{S_{j\tau}} + \overline{S_{j\tau-1}})(\overline{\ln X_{j\tau}} - \overline{\ln X_{j\tau-1}})]$$

i denotes firm, ***t*** denotes year, ***s*** denotes sectors, ***j*** denotes types of inputs
Y: outputs (real value of total operating revenue)
X: inputs including labor (number of employees), capital (real value of fixed tangible assets, material (real value of material costs)
S: share in total outputs for labor, capital and material, calculated using real wage bill, real fixed tangible assets, real value of material costs and real total operating revenue

When calculating the index we assume constant returns to scale.

Appendix 2 Estimated Production Function Coefficients, Levinsohn-Petrin Estimation*

NACE code	Sector	Capital	Labor	CRS test** (Wald test)	CRS test (p-value)
15	Manufacture of food products and beverages	0.282	0.448	388.213	0.000
17	Manufacture of textiles	0.377	0.672	12.963	0.000
18	Manufacture of wearing apparel; dressing and dyeing of fur	0.353	0.717	65.049	0.000
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	0.272	0.728	0.000	0.998
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	0.378	0.459	57.258	0.000
21	Manufacture of pulp, paper and paper products	0.349	0.430	18.426	0.000
22	Publishing, printing and reproduction of recorded media	0.334	0.671	0.046	0.830
24	Manufacture of chemicals and chemical products	0.294	0.404	89.680	0.000
25	Manufacture of rubber and plastic products	0.365	0.531	10.919	0.001
26	Manufacture of other non-metallic mineral products	0.269	0.506	61.844	0.000
27	Manufacture of basic metals	0.405	0.444	4.689	0.030
28	Manufacture of fabricated metal products, except machinery and equipment	0.354	0.636	0.276	0.599
29	Manufacture of machinery and equipment n.e.c.	0.298	0.549	21.190	0.000
30	Manufacture of office machinery and computers	0.224	0.656	6.297	0.012
31	Manufacture of electrical machinery and apparatus n.e.c.	0.334	0.557	8.765	0.003
32	Manufacture of radio, television and communication equipment and apparatus	0.437	0.488	0.812	0.367
33	Manufacture of medical, precision and optical instruments, watches and clocks	0.297	0.448	45.319	0.000
34	Manufacture of motor vehicles, trailers and semi-trailers	0.329	0.489	6.780	0.009
35	Manufacture of other transport equipment	0.323	0.582	2.126	0.145
36	Manufacture of furniture; manufacturing n.e.c.	0.291	0.497	191.696	0.000

*Value added as dependent variable

**Test on constant return to scale

Figures

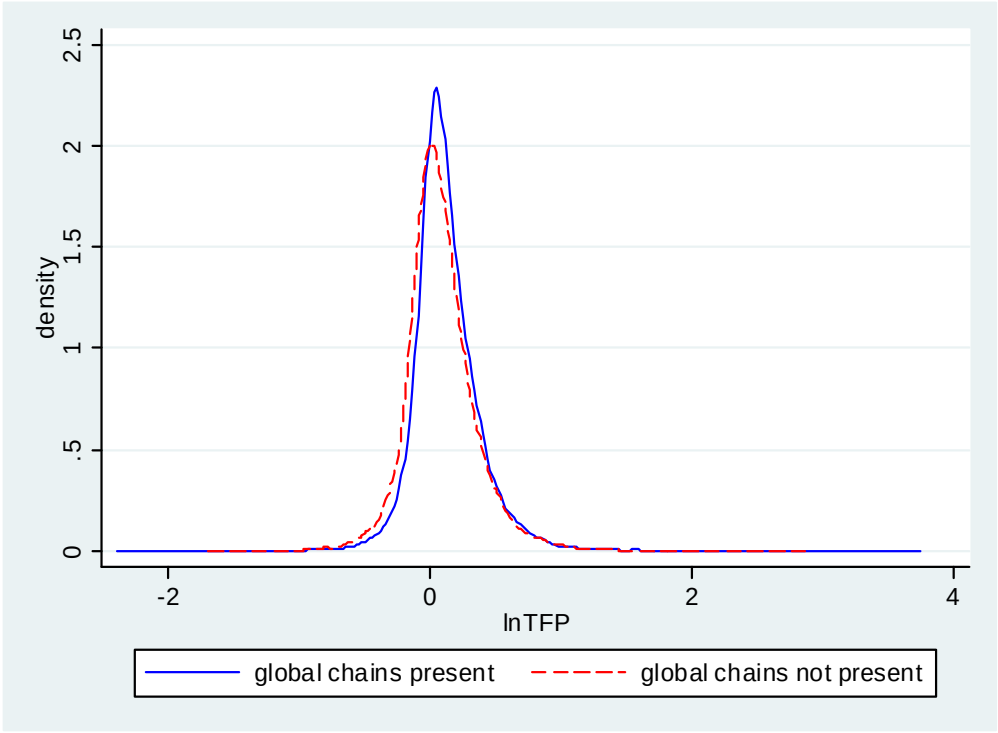
Figure 1 Regional Distribution of Global Retail Chains in Romania

1997

2005

Figure 2 Logarithm of Total Factor Productivity of Manufacturing Firms Pre- vs. Post-entry of Global Chains, Firm-Level Data

Food Supplying Sectors



Non-Food Supplying Sectors

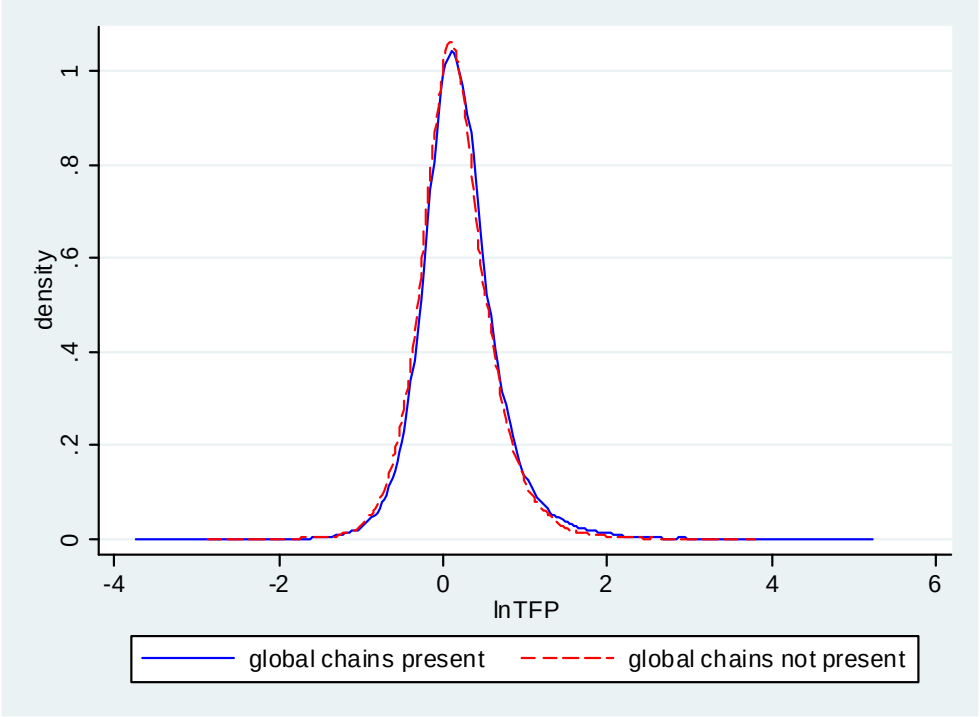
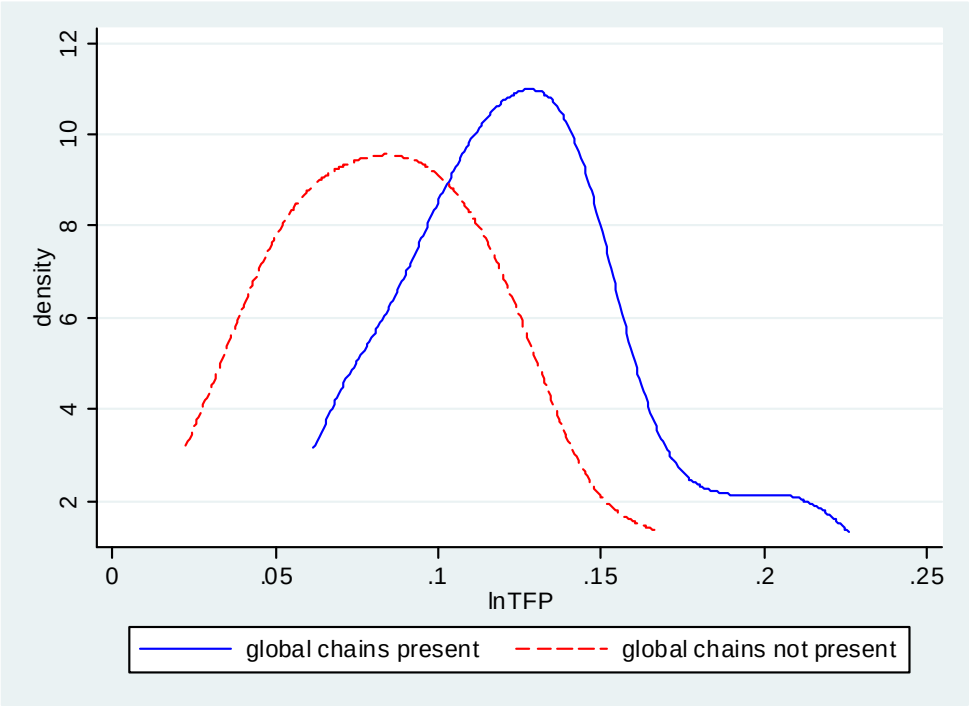


Figure 3 Logarithm of Total Factor Productivity of Manufacturing Firms

Figure 3 Pre- vs. Post-entry of Global Chains, Regional Average

Food Supplying Sectors



Non-Food Supplying Sectors

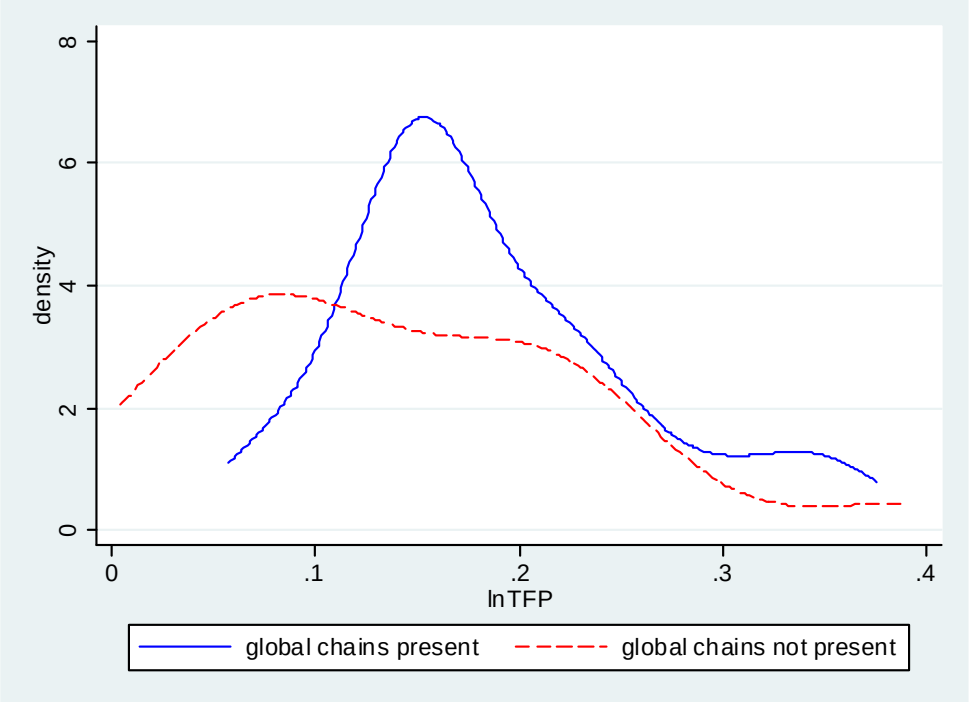


Table 1 Information on Global Retail Chains in Romania

Romanian subsidiary	parent company	country of origin	year of entry	employ-ment (2005)	capital stock** (2005)	Sales** (2005)
METRO CASH & CARRY ROMANIA SRL	Metro	Germany	1997	6197	257,056,112	1,544,382,464
SELGROS CASH & CARRY SRL	Rewe	Germany	2001	3933	172,403,312	533,114,112
HIPROMA SA	Carrefour	France	2001	2695	176,409,360	462,004,000
ROMANIA HYPERMARCHE SA	Louis Delhaize	Belgium	2003	1765	14,404,080	205,895,488
BILLA ROMANIA SRL	Rewe	Germany	1999	1613	34,777,012	291,993,056
REWE (ROMANIA) SRL	Rewe	Germany	2001	877	8,246,348	108,265,656
MEGA IMAGE SA*	Delhaize	Belgium	2000	947	14,332,003	63,057,788
PROFI ROM FOOD SRL	Louis Delhaize	Belgium	2000	401	10,242,294	44,535,040
KAUFLAND ROMANIA SCS*	Kaufland	Germany	2005	500	149,145,056	18,232,512

*outlet-specific information is not available

** figures in current US dollars

Table 2 Development of Global Retail Chains in Romania

year	number of global chains	employment	sales**	share in total sales of retail sector	share in total sales of retail and wholesale sectors
1997	1	864	125,551,016	3.20%	1.30%
1998	1	1,431	197,606,416	4.60%	1.70%
1999	2	1,455	206,881,506	5.50%	1.80%
2000	4	2,961	306,333,780	7.40%	2.30%
2001	7	5,169	584,568,802	11.60%	3.60%
2002	7	8,239	958,822,398	15.10%	4.60%
2003	8	11,167	1,574,238,984	17.70%	5.40%
2004	8	14,243	2,631,599,836	20.20%	6.10%
2005	9	18,928	3,271,480,116	22.20%	6.90%

** figures in current US dollars

Table 3 Development of Global Retail Chains in Romania*

year	number of outlets	selling space (m^2)
1997	1	13,000
1998	3	39,000
1999	5	43,000
2000	13	90,686
2001	27	174,024
2002	42	254,317
2003	55	318,013
2004	68	390,220
2005	86	463,996

*This table pertains to 7 retail chains for which detailed information is available

Table 4 Regional Expansion of Global Retail Chains in Romania

region	year of first entry	number of outlets		
		2001	2003	2005
Bucharest-Ilfov	1997	7	13	16
West	1998	8	10	19
Central	1998	3	7	13
Southeast	1999	2	5	10
South	2000	1	4	7
Northwest	2000	2	10	14
Northeast	2001	2	4	4
Southwest	2001	2	2	3

region	year of first entry	selling space (m^2)		
		2001	2003	2005
Bucharest-Ilfov	1997	43,400	96,900	115,900
West	1998	22,266	24,064	62,495
Central	1998	23,958	50,559	69,560
Southeast	1999	15,000	30,500	58,500
South	2000	2,000	23,500	33,286
Northwest	2000	26,000	41,090	62,855
Northeast	2001	26,000	36,000	36,000
Southwest	2001	15,400	15,400	25,400

*This table pertains to 7 retail chains for which detailed information is available

Table 5 Summary Statistics of Retailers

Global Retail Chains (9 companies)

Variable	Obs	Mean	Std. Dev.	Min	Max
L	47	1371.43	1469.92	36	6197
K (th lei 2000)	47	84409.71	100424.8	1659.4	328590.3
K/L(th lei 2000)	47	71.82	93.99	9.48	540.04
sales(th lei 2000)	47	313292.4	442300.3	2626	1771543
market share	47	11.78	16.13	0.17	49.59
sales/L (th lei 2000)	47	191.66	116.31	41.83	715.33
wage/L (th lei 2000)	47	8.45	7.23	2.66	53.41
value added/L* (th lei 2000)	47	21.2	15.29	0	90.57
ROA*	47	-0.01	0.09	-0.22	0.14
ROS**	47	-0.05	0.19	-1.1	0.05
firm age	47	3.55	2.05	1	9

Other Retailers or Wholesale Traders (Employment >= 50) (923 companies)

Variable	Obs	Mean	Std. Dev.	Min	Max
L	6587	133.28	263.97	1	6163
K (th lei 2000)	3293	258.5	452.7	0.3	13337
K/L(th lei 2000)	3293	5.74	12.96	0	291.92
sales(th lei 2000)	2822	2028.77	2500.4	0.39	54824
market share	2822	0.11	0.14	0	3.51
sales/L (th lei 2000)	2822	47.66	91.19	0	2410.46
wage/L (th lei 2000)	2136	3.16	4.1	0	105.3
value added/L*(th lei 2000)	2732	8.13	17.59	0	511.54
ROA*	1913	0.05	0.16	-3.01	1.88
ROS**	1875	0.02	0.17	-5	2.9
firm age	6587	8.69	3.52	1	16

*value added/L = (sales – material costs)/employment

**ROA: return on assets = profits/assets

***ROS: return on sales = profits/sales

Table 6 Results on Retailer Performance

	ln(L)	*ln(K)*	*ln(K/L)*	*ln(sales)*	*market share*
global_chain	2.428***	4.639***	3.211***	3.556***	12.555*
	(0.314)	(0.466)	(0.354)	(0.385)	(6.889)
No. of obs.	6634	2651	2651	2282	2282

	ln(sales/L)	*ln(wage/L)*	*ln(value added)/L)*	*ROA*	*ROS*
global_chain	2.803***	1.182***	1.855***	-0.014	-0.006
	(0.324)	(0.149)	(0.282)	(0.049)	(0.018)
No. of obs.	2282	1585	2312	1564	1525

value added/L = (sales – material costs)/L

ROA: return to assets = profits/assets

ROS: return to sales = profits/sales

All models include logarithmic of firm age and lagged value of employment, regional fixed effects and year fixed effects.

Robust standard errors

* significant at 10%, ** at 5%, *** at 1%

Table 7 Food Supplying Sectors

NACE	**industry description**
151	Production, processing and preserving of meat and meat products
153	Processing and preserving of fruit and vegetables
155	Manufacture of dairy products
156	Manufacture of grain mill products, starches and starch products
158	Manufacture of other food products
159	Manufacture of beverages

Table 8 Summary Statistics of Manufacturing Firms

Firm-specific

Variable	Obs	Mean	Std. Dev.	Min	Max
FOOD					
TFPindex*	49611	0.12	0.28	-2.39	3.74
TFP	57684	1.49	1.07	-7.16	7.09
output (th lei 2000)	57684	1048.98	7423.96	0.00	410024.10
wage costs (th lei 2000)	56675	85.78	607.40	0.00	49457.04
material costs (th lei 2000)	57684	744.26	5114.54	0.00	361034.50
capital stock (th lei 2000)	57684	355.97	3544.39	0.00	257176.30
employment	57684	23.44	156.12	1.00	30204.00
firm age	57684	7.66	3.43	1.00	15.00
Non-FOOD					
TFPindex*	171625	0.19	0.49	-3.74	5.22
TFP	191708	1.51	1.10	-16.50	6.87
output (th lei 2000)	191708	1536.68	20379.34	0.00	2917021.00
wage costs (th lei 2000)	187901	268.92	2448.16	0.00	351674.60
material costs (th lei 2000)	191708	901.43	13846.16	0.00	1917256.00
capital stock (th lei 2000)	191708	696.57	13502.77	0.00	2246537.00
employment	191708	57.02	343.78	1.00	36575.00
firm age	191708	7.29	3.61	1.00	16.00

NACE sector-specific

Variable	Obs	Mean	Std. Dev.	Min	Max
FOOD					
imports (th lei 2000)	48	168905.50	174682.00	22423.92	644413.90
exports (th lei 2000)	48	48694.17	58350.96	1496.87	312933.10
Herfindahl Index	48	0.032	0.018	0.009	0.076
Non-FOOD					
imports (th lei 2000)	705	602026.40	952913.20	2712.52	8217282.00
exports (th lei 2000)	705	552159.30	1458871.00	619.63	12900000.00
Herfindahl Index	705	0.160	0.174	0.004	1.000

NUTS region-specific

Variable	Obs	Mean	Std. Dev.	Min	Max
wage/L *(th lei 2000)*	64	4.544	0.926	1.882	7.282

*TFP index calculated following Aw, Chen and Roberts (2001)

**TFP calculated following Levinsohn and Petrin (2003)

Table 9 Fixed-effect, ln(TFP) of Manufacturing Firms, TFP index

	chains present		ln(number of outlets)		ln(selling space)	
$Food_s*(global\_chain)_{r,t-1}$	0.047***	0.038***	0.037***	0.033***	0.005***	0.004***
	-0.01	-0.01	(0.005)	(0.005)	(0.001)	(0.001)
$ln(firm\ age)_{it}$	0.118***	0.117***	0.119***	0.118***	0.118***	0.117***
	(0.008)	-0.008	(0.008)	(0.008)	(0.008)	(0.008)
$ln(imports)_{s,t-1}$		-0.029***		-0.020***		-0.027***
		(0.005)		(0.005)		(0.005)
$ln(exports)_{s,t-1}$		-0.004		-0.004		-0.004
		(0.004)		(0.004)		(0.004)
$Herfindahl\ Index_{st}$		-0.190***		-0.210***		-0.196***
		(0.040)		(0.039)		(0.040)
R-squared	0.019	0.02	0.02	0.021	0.019	0.02
No. of obs.	221236	220002	221236	220002	221236	220002
No. of groups	49552	49390	49552	49390	49552	49390

All models include firm fixed effects and region-year fixed effects.
Standard errors are clustered at the region-year level.
* significant at 10%, ** at 5%, *** at 1%

Table 10 Fixed-effect, ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

	chains present		ln(number of outlets)		ln(selling space)	
$Food_s*(global\_chain)_{r,t-1}$	0.169***	0.152***	0.113***	0.108***	0.018***	0.017***
	(0.031)	(0.029)	(0.015)	(0.014)	(0.003)	(0.003)
$ln(firm\ age)_{it}$	0.318***	0.321***	0.323***	0.325***	0.319***	0.321***
	(0.015)	(0.015)	(0.014)	(0.015)	(0.015)	(0.015)
$ln(imports)_{s,t-1}$		-0.059***		-0.036**		-0.052***
		(0.017)		(0.016)		(0.017)
$ln(exports)_{s,t-1}$		-0.037***		-0.038***		-0.037***
		(0.012)		(0.012)		(0.012)
$Herfindahl\ Index_{st}$		-0.366***		-0.406***		-0.386***
		(0.088)		(0.088)		(0.087)
R-squared	0.03	0.031	0.031	0.032	0.03	0.032
No. of obs.	219397	219397	219397	219397	219397	219397
No. of groups	49333	49333	49333	49333	49333	49333

All models include firm fixed effects and region-year fixed effects.
Standard errors are clustered at the region-year level.
* significant at 10%, ** at 5%, *** at 1%

Table 11 Excluding Bucharest, Fixed-effect
ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

	chains present		ln(number of outlets)		ln(selling space)	
	1	2	3	4	5	6
$FOOD_s*(global\_chain)_{r,t-1}$	0.158***	0.140***	0.112***	0.108***	0.017***	0.016***
	(0.032)	(0.029)	(0.017)	(0.015)	(0.003)	(0.003)
$ln(firm\ age)_{it}$	0.307***	0.310***	0.313***	0.314***	0.308***	0.310***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
$ln(imports)_{s,t-1}$		-0.061***		-0.036**		-0.054***
		(0.019)		(0.017)		(0.018)
$ln(exports)_{s,t-1}$		-0.049***		-0.050***		-0.049***
		(0.012)		(0.012)		(0.012)
$Herfindahl\ Index_{st}$		-0.321***		-0.370***		-0.342***
		(0.100)		(0.102)		(0.100)
R-squared	0.029	0.031	0.031	0.033	0.03	0.032
No. of obs.	185335	185335	185335	185335	185335	185335
No. of groups	41236	41236	41236	41236	41236	41236

All models include firm fixed effects and region-year fixed effects.

Standard errors are clustered at the region-year level.

* significant at 10%, ** at 5%, *** at 1%

Table 12 First Differences
ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

	chains present		ln(number of stores)		ln(selling space)	
	1	2	3	4	5	6
$FOOD_s*\Delta(global\_chain)_{r,t-1}$	0.124***	0.122***	0.149***	0.163***	0.016***	0.016***
	(0.040)	(0.037)	(0.036)	(0.036)	(0.003)	(0.003)
$\Delta ln(imports)_{s,t-1}$		0.054**		0.071***		0.056**
		(0.023)		(0.022)		(0.023)
$\Delta ln(exports)_{s,t-1}$		-0.066***		-0.066***		-0.066***
		(0.011)		(0.011)		(0.011)
$\Delta Herfindahl\ Index_{st}$		-0.308**		-0.344**		-0.319**
		(0.131)		(0.133)		(0.130)
R-squared	0.016	0.017	0.017	0.019	0.016	0.018
No. of obs.	168282	168174	168282	168174	168282	168174

All models include region-year fixed effects.

Standard errors are clustered at the region-year level.

* significant at 10%, ** at 5%, *** at 1%

Table 13 Second Differences
ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

	chains present		ln(number of stores)		ln(selling space)	
	1	2	3	4	5	6
$FOOD_s*\Delta(global\_chain)_{r,t-1}$	0.135***	0.147***	0.134***	0.158***	0.016***	0.018***
	(0.045)	(0.043)	(0.024)	(0.024)	(0.004)	(0.004)
$\Delta ln(imports)_{s,t-1}$		0.033		0.063***		0.039
		(0.026)		(0.022)		(0.026)
$\Delta ln(exports)_{s,t-1}$		-0.063***		-0.065***		-0.063***
		(0.018)		(0.017)		(0.018)
$\Delta Herfindahl\ Index_{s\,t}$		-0.292**		-0.333***		-0.309**
		(0.121)		(0.123)		(0.122)
R-squared	0.016	0.018	0.017	0.02	0.016	0.018
No. of obs.	133730	133730	133730	133730	133730	133730

All models include region-year fixed effects.
Standard errors are clustered at the region-year level.
* significant at 10%, ** at 5%, *** at 1%

Table 14 Cross-section on Long Differences (8 year)
ln(TFP) of Manufacturing Firms , Levinsohn-Petrin TFP

	chains present		ln(number of stores)		ln(selling space)	
	1	2	3	4	5	6
$FOOD_s*\Delta(global\_chain)_{r,t-1}$	0.476***	0.404***	0.205***	0.160***	0.045***	0.038***
	(0.048)	(0.053)	(0.031)	(0.026)	(0.005)	(0.005)
$\Delta ln(imports)_{s,t-1}$		-0.080***		-0.109***		-0.081***
		(0.019)		(0.019)		(0.018)
$\Delta ln(exports)_{s,t-1}$		-0.035*		-0.042**		-0.035*
		(0.018)		(0.018)		(0.017)
$\Delta Herfindahl\ Index_{s\,t}$		-0.17		-0.095		-0.166
		(0.270)		(0.248)		(0.269)
R-squared	0.036	0.037	0.033	0.035	0.036	0.037
No. of obs.	11253	11253	11253	11253	11253	11253

All models include region fixed effects.
Standard errors are clustered at the region-year level.
* significant at 10%, ** at 5%, *** at 1%

Table 15 Robustness Check on Autocorrelation, Fixed-effect ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

First Stage Estimation

	1	2
ln(firm age) $_{it}$	0.405***	0.405***
	(0.009)	(0.009)
ln(imports) $_{s,t-1}$	-0.092***	-0.092***
	(0.006)	(0.006)
ln(exports) $_{s,t-1}$	-0.032***	-0.032***
	(0.004)	(0.004)
Herfindahl Index $_{st}$	-0.283***	-0.283***
	(0.074)	(0.074)
R-squared	0.025	0.025
No. of obs.	248008	248008
No. of groups	51765	51765

Second Stage Estimation, only FOOD producing sectors

	1	2
(global_chain) $_{r,t-1}$	0.063***	
	(0.006)	
(global_chain) $_{r,t}$		0.064***
		(0.007)
R-squared	0.006	0.006
No. of obs.	15901	15931

First stage estimation includes firm fixed effects and region-year fixed effects.

Standard errors are clustered at the region-year level.

* significant at 10%, ** at 5%, *** at 1%

Table 16 Pre-entry Impact, Fixed-effect
ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

	chains present		ln(number of outlets)		ln(selling space)	
	1	2	3	4	5	6
FOOD $_s$ ****(global_chain)*** $_{r,t-1}$	0.164***	0.135**	0.103***	0.096***	0.019***	0.016***
	(0.060)	(0.059)	(0.020)	(0.019)	(0.006)	(0.006)
FOOD $_s$ ****(1_year_before)*** $_{r,t}$	0.014	0.003	0.004	0	0.03	0.018
	(0.068)	(0.066)	(0.052)	(0.051)	(0.067)	(0.065)
ln(firm age) $_{it}$	0.317***	0.320***	0.322***	0.324***	0.318***	0.320***
	(0.015)	(0.015)	(0.014)	(0.015)	(0.015)	(0.015)
ln(imports) $_{s,t-1}$		-0.067***		-0.041**		-0.060***
		(0.018)		(0.016)		(0.018)
ln(exports) $_{s,t-1}$		-0.036***		-0.038***		-0.036***
		(0.011)		(0.011)		(0.011)
Herfindahl Index $_{st}$		-0.336***		-0.405***		-0.363***
		(0.093)		(0.087)		(0.092)
F test on FOOD*(global_chain) = FMCG *(1_year_before)	12.397	9.878				
p-value of F test	0.001	0.002				
R-squared	0.029	0.03	0.03	0.032	0.029	0.031
No. of obs.	219397	219397	219397	219397	219397	219397
No. of groups	49333	49333	49333	49333	49333	49333

All models include firm fixed effects and region-year fixed effects.
Standard errors are clustered at the region-year level.
* significant at 10%, ** at 5%, *** at 1%

Table 17 IV Approach, Fixed-effect
ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

First Stage Estimation

	chains present		ln(number of stores)		ln(selling space)	
sale_share$_{sr}$*ln(global_chain_1stWave)	-0.018***	-0.012***	-0.070***	-0.056***	-0.218***	-0.153***
	(0.003)	(0.002)	(0.004)	(0.004)	(0.025)	(0.024)
sale_share$_{sr}$*ln(global_chain_2ndWave)	1.074***	0.588***	2.937***	1.823***	12.286***	7.044***
	(0.034)	(0.032)	(0.059)	(0.054)	(0.334)	(0.317)
ln(firm age) $_{it}$	0.304***	0.299***	0.405***	0.394***	2.930***	2.877***
	(0.007)	(0.007)	(0.012)	(0.011)	(0.069)	(0.065)
ln(import) $_{s,t-1}$		-0.204***		-0.478***		-2.217***
		(0.002)		(0.003)		(0.016)
ln(export) $_{s,t-1}$		-0.011***		-0.004**		-0.098***
		(0.001)		(0.002)		(0.011)
Herfindahl Index $_{st}$		0.663***		1.156***		6.783***
		(0.020)		(0.034)		(0.197)
R-squared	0.32	0.382	0.318	0.428	0.324	0.397
No. of obs.	209619	209619	209619	209619	209619	209619
No. of groups	39555	39555	39555	39555	39555	39555
Shea's Partial R-squared	0.095	0.066	0.113	0.077	0.104	0.072
F test on IVs	8961	6038	10843	7042	9846	6603
p-value of F test	0.000	0.000	0.000	0.000	0.000	0.000
Second Stage Estimation						
FOOD$_s$*(global_chain) $_{r,t-1}$	0.122***	0.104***	0.065***	0.058***	0.012***	0.010***
	(0.022)	(0.029)	(0.012)	(0.016)	(0.002)	(0.003)
ln(firm age) $_{it}$	0.317***	0.320***	0.320***	0.322***	0.318***	0.320***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
ln(import) $_{s,t-1}$		-0.070***		-0.063***		-0.068***
		(0.008)		(0.010)		(0.009)
ln(export) $_{s,t-1}$		-0.037***		-0.038***		-0.037***
		(0.003)		(0.003)		(0.003)
Herfindahl Index $_{st}$		-0.318***		-0.318***		-0.319***
		(0.069)		(0.068)		(0.069)
R-squared	0.029	0.031	0.03	0.031	0.03	0.031
No. of obs.	209619	209619	209619	209619	209619	209619
No. of groups	39555	39555	39555	39555	39555	39555
Sargan test	1.666	0.412	0.513	0.042	1.333	0.292
p-value for Sargan test	0.197	0.521	0.474	0.838	0.248	0.589

All models include firm fixed effects and region-year fixed effects.

Standard errors are clustered at the region-year level.

* significant at 10%, ** at 5%, *** at 1%

Table 18 Adding Regional Wage Rate Fixed-effect
ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

	chains present		ln(number of outlets)		ln(selling space)	
$FOOD_s$*(global_chain) $_{r,t-1}$	0.093***	0.072***	0.077***	0.065***	0.011***	0.009***
	(0.027)	(0.025)	(0.014)	(0.012)	(0.003)	(0.002)
$FOOD_s$*(wage_per_L) $_{r,t-1}$	0.337***	0.282***	0.176**	0.160*	0.316***	0.268***
	(0.076)	(0.074)	(0.085)	(0.090)	(0.073)	(0.074)
ln(firm age) $_{it}$	0.325***	0.326***	0.328***	0.329***	0.326***	0.327***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
ln(imports) $_{s,t-1}$		-0.066***		-0.049***		-0.061***
		(0.018)		(0.016)		(0.017)
ln(exports) $_{s,t-1}$		0.009		0.008		0.009
		(0.008)		(0.008)		(0.008)
Herfindahl Index $_{st}$		-0.515***		-0.562***		-0.530***
		(0.094)		(0.096)		(0.094)
R-squared	0.026	0.028	0.027	0.028	0.027	0.028
No. of obs.	199710	199710	199710	199710	199710	199710
No. of groups	48269	48269	48269	48269	48269	48269

As wage rates are only available since 1997 and several explanatory variables are lagged by one period these analyses are based on observations from 1998 to 2005.
All models include firm fixed effects and region-year fixed effects.
Standard errors are clustered at the region-year level.
* significant at 10%, ** at 5%, *** at 1%

Table 19 Adding Regional Wage Rate, First Differences
ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

	chains present		ln(number of stores)		ln(selling space)	
$FOOD_s * \Delta(global\_chain)_{r,t-1}$	0.122***	0.119***	0.168***	0.165***	0.016***	0.016***
	(0.037)	(0.038)	(0.036)	(0.037)	(0.003)	(0.003)
$FOOD_s * \Delta(wage\_per\_L)_{r,t-1}$		0.135		0.039		0.131
		(0.125)		(0.093)		(0.122)
$\Delta ln(imports)_{s,t-1}$	0.078**	0.081***	0.102***	0.102***	0.080***	0.083***
	(0.030)	(0.030)	(0.028)	(0.028)	(0.030)	(0.029)
$\Delta ln(exports)_{s,t-1}$	-0.047***	-0.048***	-0.048***	-0.048***	-0.047***	-0.047***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
$\Delta Herfindahl\ Index_{s\,t}$	-0.326**	-0.320**	-0.371**	-0.368**	-0.339**	-0.333**
	(0.141)	(0.141)	(0.143)	(0.142)	(0.141)	(0.140)
R-squared	0.007	0.007	0.008	0.008	0.007	0.007
No. of obs.	150866	150866	150866	150866	150866	150866

As wage rates are only available since 1997 and several explanatory variables are lagged by one period these analyses are based on observations from 1998 to 2005.
All models include region-year fixed effects.
Standard errors are clustered at the region-year level.
* significant at 10%, ** at 5%, *** at 1%

Table 20 Adding Regional Wage Rate, Cross-section on Long Differences (7 years)
ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

	chains present		ln(number of stores)		ln(selling space)	
$FOOD_s * \Delta(global\_chain)_{r,t-1}$	0.165***	0.156***	0.068***	0.065***	0.015***	0.015***
	(0.031)	(0.030)	(0.015)	(0.015)	(0.003)	(0.003)
$FOOD_s * \Delta(wage\_per\_L)_{r,t-1}$		0.242**		0.166		0.211**
		(0.081)		(0.119)		(0.071)
$\Delta ln(imports)_{s,t-1}$	-0.216***	-0.217***	-0.224***	-0.225***	-0.216***	-0.217***
	(0.012)	(0.011)	(0.015)	(0.015)	(0.012)	(0.011)
$\Delta ln(exports)_{s,t-1}$	-0.009	-0.01	-0.01	-0.01	-0.009	-0.01
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
$\Delta Herfindahl\ Index_{s\,t}$	0.03	0.031	0.057	0.062	0.03	0.033
	(0.183)	(0.182)	(0.175)	(0.174)	(0.182)	(0.181)
R-squared	0.027	0.028	0.027	0.027	0.027	0.028
No. of obs.	12538	12538	12538	12538	12538	12538

As wage rates are only available since 1997 and several explanatory variables are lagged by one period these analyses are based on observations of 1998 and 2005.
All models include region-year fixed effects.
Standard errors are clustered at the region-year level.
* significant at 10%, ** at 5%, *** at 1%

Table 21 Adding Regional Wage Rate, IV Approach
ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

First Stage Estimation

	chains present		ln(number of stores)		ln(selling space)	
$sale\_share_{sr}$*ln(global_chain_1stWave)	1.469***	1.379***	8.210***	6.684***	20.663***	18.833***
	(0.053)	(0.054)	(0.089)	(0.086)	(0.518)	(0.523)
$sale\_share_{sr}$*ln(global_chain_2ndWave)	0.222***	0.231***	-0.191***	-0.036***	1.661***	1.846***
	(0.008)	(0.008)	(0.013)	(0.012)	(0.074)	(0.074)
$Food_s$*(wage_per_L) $_{r,t-1}$		0.106***		1.807***		2.166***
		(0.010)		(0.016)		(0.095)
ln(firm age) $_{it}$	-0.014***	-0.013***	-0.061***	-0.052***	-0.174***	-0.163***
	(0.002)	(0.002)	(0.004)	(0.004)	(0.024)	(0.024)
ln(import) $_{s,t-1}$	-0.176***	-0.173***	-0.485***	-0.432***	-1.985***	-1.922***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.017)	(0.018)
ln(export) $_{s,t-1}$	0.024***	0.023***	0.050***	0.049***	0.242***	0.240***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.013)	(0.013)
Herfindahl-hirschman Index $_{st}$	0.515***	0.515***	0.959***	0.960***	5.344***	5.345***
	(0.023)	(0.023)	(0.039)	(0.037)	(0.226)	(0.226)
R-squared	0.359	0.359	0.451	0.495	0.379	0.382
No. of obs.	189710	189710	189710	189710	189710	189710
No. of group	38269	38269	38269	38269	38269	38269
Shea's Partial R-square	0.06	0.059	0.12	0.108	0.071	0.068
F test on IVs	4829.29	4728.183	10361.994	9147.254	5783.63	5553.815
p-value of F test	0.000	0.000	0.000	0.000	0.000	0.000
Second Stage Estimation						
$FOOD_s$*(global_chain) $_{r,t-1}$	0.145***	0.122***	0.072***	0.062***	0.014***	0.012***
	(0.031)	(0.032)	(0.013)	(0.014)	(0.003)	(0.003)
$FOOD_s$*(wage_per_L) $_{r,t-1}$		0.273***		0.167***		0.258***
		(0.030)		(0.041)		(0.031)
ln(firm age) $_{it}$	0.326***	0.327***	0.328***	0.329***	0.326***	0.327***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
ln(import) $_{s,t-1}$	-0.061***	-0.056***	-0.050***	-0.050***	-0.057***	-0.054***
	(0.008)	(0.008)	(0.009)	(0.009)	(0.008)	(0.008)
ln(export) $_{s,t-1}$	0.008*	0.008*	0.007*	0.008*	0.007*	0.008*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Herfindahl-hirschman Index $_{st}$	-0.564***	-0.554***	-0.568***	-0.557***	-0.570***	-0.558***
	(0.075)	(0.075)	(0.074)	(0.074)	(0.075)	(0.075)
R-squared	0.026	0.027	0.028	0.028	0.027	0.028
No. of obs.	189710	189710	189710	189710	189710	189710
No. of group	38269	38269	38269	38269	38269	38269
sargan test	12.763	5.388	2.068	0.807	9.761	4.014
p-value for sargan test	0.000	0.02	0.15	0.369	0.002	0.045

All models include firm fixed effects and region-year fixed effects. Standard errors are clustered at the region-year level. * significant at 10%, ** at 5%, *** at 1%

Table 22 Firms with Different Sizes, Fixed-effect ln(TFP) of Manufacturing Firms, Levinsohn-Petrin TFP

	chains present	ln(number of stores)	ln(selling space)
Employment > 25			
$FOOD_s*(global\_chain)_{r,t-1}$	0.190***	0.142***	0.021***
	(0.029)	(0.031)	(0.003)
R-squared	0.038	0.04	0.039
No. of obs.	48236	48236	48236
Employment <= 25			
$FOOD_s*(global\_chain)_{r,t-1}$	0.142***	0.097***	0.016***
	(0.030)	(0.015)	(0.003)
R-squared	0.033	0.033	0.033
No. of obs.	171161	171161	171161
Employment <= 15			
$FOOD_s*(global\_chain)_{r,t-1}$	0.140***	0.093***	0.015***
	(0.031)	(0.015)	(0.003)
R-squared	0.035	0.035	0.035
No. of obs.	149854	149854	149854
Employment <= 5			
$FOOD_s*(global\_chain)_{r,t-1}$	0.120***	0.085***	0.013***
	(0.032)	(0.015)	(0.003)
R-squared	0.041	0.042	0.041
No. of obs.	86702	86702	86702

All models include firm age, sector-level imports, exports and concentration as well as firm fixed effects and region-year fixed effects.

Standard errors are clustered at the region-year level.

* significant at 10%, ** at 5%, *** at 1%